Scientific Activities of

the Government of Alberta

Overview 1990 – 91

Alberta
TECHNOLOGY, RESEARCH
AND TELECOMMUNICATIONS

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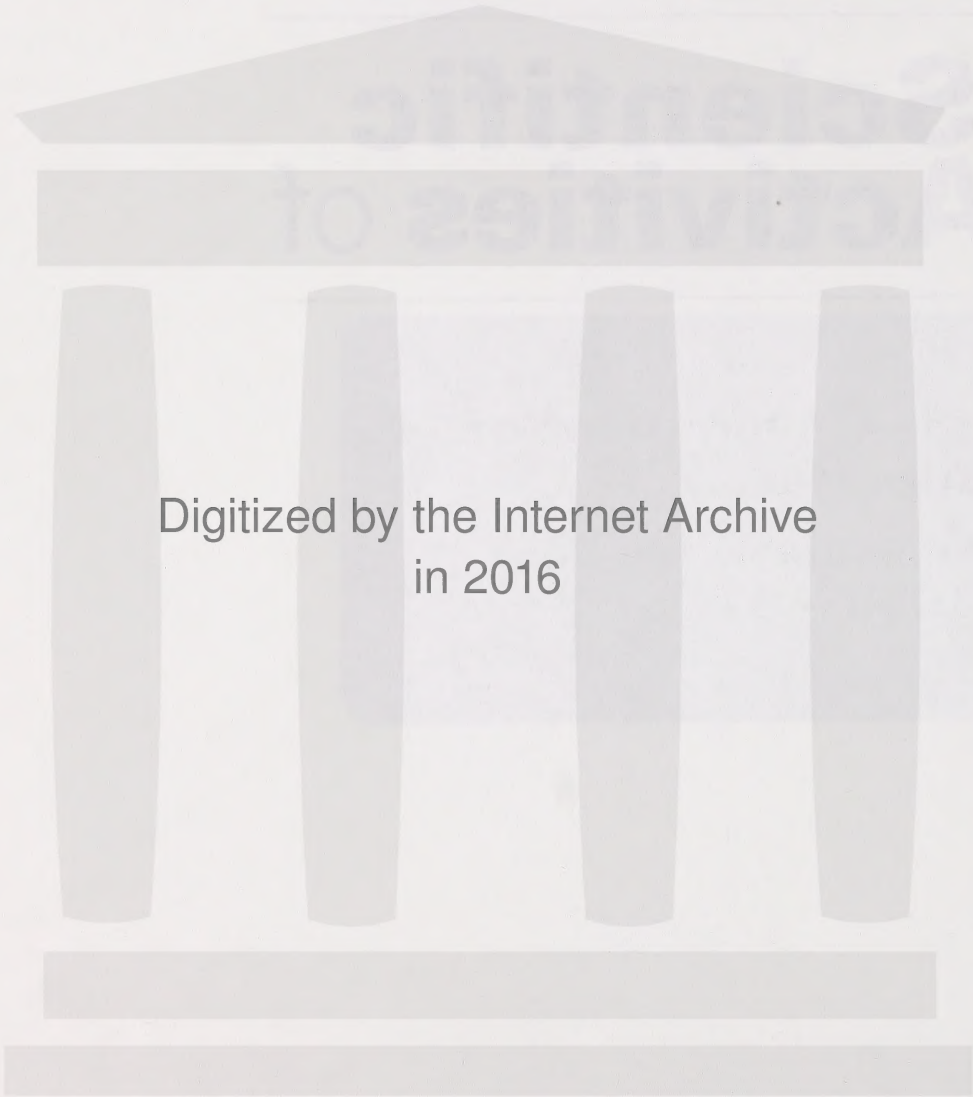

Introduction

Technology, Research and Telecommunications (TRT), in cooperation with Statistics Canada, conducts an annual survey of Alberta government departments and agencies which perform or fund research and development and/or related scientific activities. This report stems from the 1990/91 survey and provides a brief overview of its results. Please note that the Alberta Research Council is excluded from this survey, although it is a large part of Alberta's research community. Data for the Council is included in a separate survey for provincial research organizations.

The data from the science survey is based on each respondent's interpretation of definitions and methods of calculation. While these are still estimates, they are a good indicator of the year's science expenditures. However, the reader should be cautioned when drawing conclusions from the data and should be made aware of an estimated confidence interval of ±15%. Please note that figures may not add due to rounding.

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After a three year decline in provincial science expenditures the 1990/91 fiscal year saw an increase of $20.8 million from the previous year. Furthermore, R&D expenditures increased by $20.1 million, the first increase since 1986/87. This helped to generate a slight increase in the percentage of dollars spent on R&D relative to total science expenditures. The overall increase was attributed to a $24.4 million (12.3%) growth in the natural sciences which more than offset the $3.7 million (7.5%) decline in the social sciences. Table 1 provides a five year historical outlining several types of expenditures.

Increases in the 1990/91 natural science dollars came primarily from AOSTRA($14.0 million), TR&T ($6.4 million) and Forestry, Lands and Wildlife ($3.1 million). These increases were mainly in the form of disbursements to universities, industries and for intramural activities. One other significant change was in the department of Energy which spent $2.8 million less in the natural sciences.

Compared to the previous year, Advanced Education and the Solicitor General, which report in the social sciences, had fewer science expenditures. This amounted to $3.8 million dollars.

Table 1

Total Science Expenditures by Activity, 1986/87-1990/91

Expenditure	1986/87	1987/88	1988/89	1989/90	1990/91
		(in millions of dollars)			
Total Science	333.4	254.2	248.7	247.3	268.1
Natural Science	289.0	213.1	206.3	198.1	222.5
Social Science	44.4	41.0	42.3	49.2	45.5
Total R&D	251.9	172.7	150.1	148.2	168.3
Total RSA	81.5	81.5	98.5	99.0	99.8
		(percentage)			
Natural Science	86.7	83.8	83.0	76.5	83.0
Total R&D	75.6	67.9	60.4	60.0	62.8

Objectives of Expenditures

Industrial and Economic Development, and Energy and Fuels were the main objectives of the 1990/91 provincial science survey. Although these represented only two of the ten objectives in the survey, they accounted for 39% of the year's science expenditures. In addition, these two objectives focused mainly on research and development (R&D), providing 51% of the total R&D expenditures. Other dominant objectives were Health, Social Development and Environmental Issues. As Table 2 shows, each of these three accounted for approximately 14% of total expenditures.

Industrial and Economic Development, as in previous years, has maintained the largest share of expenditures, claiming 22% of all provincial science dollars. Of this share, two sub components, manufacturing and agriculture, comprised 83% of this objective. The major contributor to manufacturing and agriculture were TRT ($28 million) and Agriculture ($21 million) respectively.

Contributors to the Energy and Fuels objective were the Alberta Oil Sands Technology and Research Authority (AOSTRA) and Alberta Energy. AOSTRA accounted for 86% of this objective. Over 95% of Energy and Fuels' science dollars were directed towards fossil fuels.

The Alberta Heritage Foundation for Medical Research (AHFMR) was the primary funder of Health objectives, providing three quarters of these expenditures. The department of Health which was the second largest contributor funded 19%.

Social Development issues were mainly undertaken by the department of Culture and Multiculturalism. Almost all of Social Development expenditures were directed towards related scientific activities (RSA). The sub component Culture, Sports and Recreation dominated 58% of this issue.

As with Social Development, Environmental Issues focused on RSA. In fact, 71 % of these dollars was spent on RSA. The departments of Environment and Forestry, Lands and Wildlife financed the bulk of this objective, contributing 53% and 47% respectively.

Differences in objectives between the social and natural sciences were very apparent. The main objectives for the natural sciences were Industrial and Economic Development (25.5%), Environmental Issues (16.3%) and Health (15.1%). In the social sciences they were Social Development (75.1%) and Health (12.7%).

Table 2

Objectives of Expenditures by Activity, 1990-91

Objective	R&D	RSA	Total	Percent
		(in thousands of dollars)		
Advancement of Science	7,013	1,970	8,983	3.3
Communications	–	–	–	–
Energy and Fuels				
Conservation	–	–	–	
Fossil Fuels	38,945	2,600	41,545	
Hydro Electric Energy	–	–	–	
Renewable Resources	1,458	556	2,014	
Other	–	–	–	
Sub-Total	40,403	3,156	43,559	16.2
Environmental Issues				
Air	1,502	2,938	4,440	
Land	4,745	1,047	5,792	
Water	2,109	2,180	4,289	
Other	1,735	21,419	23,154	
Sub-Total	10,091	26,584	37,675	14.0
Health	33,919	5,575	39,494	14.7
Industrial and Economic Development				
Agriculture	13,979	7,178	21,157	
Fisheries	15	106	121	
Forestry	3,883	1,103	4,896	
Manufacturing	25,956	2,469	28,425	
Minerals	–	–	–	
Other	1,839	3,525	5,364	
Sub-Total	45,672	14,381	59,962	22.4
Social Development				
Culture, Sports & Recreation	–	22,889	22,889	
Education	105	3,132	3,237	
Human Resources	–	2,795	2,795	
Urban & Regional Studies	–	–	–	
Other	1,107	9,069	10,176	
Sub-Total	1,212	37,885	39,097	14.6
Transportation	2,320	7,327	9,647	3.6
Wildlife	277	1,967	2,244	0.8
Other	27,411	–	27,411	10.2
Total	**168,318**	**99,845**	**268,163**	**100**

Total Expenditures by Department/Agency and Performer

Of the twenty-six respondents in the 1990/91 survey, the top three science budgets, TR&T, AOSTRA and AHFMR, provided almost half of the total provincial science expenditures. Collectively, these three organizations concentrated their efforts towards universities, industry and provincial research organizations (Alberta Research Council).

Of the six performers indicated on Table 3, intramural activities accounted for the greatest share of science dollars, a total of 38%. Agriculture, Environment, Culture and Multiculturalism and Forestry Lands and Wildlife were the major funders in this area. Of the extramural performers, industry captured 26%, universities 15%, provincial research organizations 13%, 'other' 6% and hospitals 1%.

AOSTRA was the dominate funder of industry with a 45% percent share. Following closely behind in this area was TR&T which provided 30%.

The greatest funder of universities was the AHFMR. The AHFMR contributed 87% of their science budget towards universities which translated to 63% of all provincial funds to universities.

With respect to provincial research organizations, TR&T expended 48% of its science budget to this performer. This represented 78% of provincial funds to the ARC.

Table 3

Total Expenditures by Department/Agency and Performing Sector, 1990-91

Dept/Agency	Intramural	Industry	University	Hospital	ARC	Other	Total
			(in thousands of dollars)				
TR&T	1,081	21,433	5,517	370	27,411	394	56,206
AOSTRA	4,995	32,055	4,225	–	4,456	1,534	46,265
AHFMR	1,555	1,086	25,719	–	–	1,249	29,609
Forestry, Lands & Wildlife	18,421	4,143	351	–	1,249	394	24,558
Culture & Multiculturalism	17,578	–	–	–	–	5,278	22,856
Agriculture	13,984	841	2,053	–	–	4,279	21,157
Environment (1)	15,712	2,100	116	–	494	1,368	19,790
Transportation & Utilities	8,011	367	120	–	313	636	9,447
Health	3,170	940	1,442	1,776	–	–	7,328
Energy	929	2,919	601	–	1,065	436	5,950
Municipal Affairs	2,538	896	82	–	8	7	3,531
Economic Dev. & Trade	1,877	1,056	25	–	3	399	3,360
Solicitor General	1,488	1,049	–	–	–	–	2,537
Treasury	2,085	174	–	–	–	–	2,259
Tourism	1,040	748	–	–	–	249	2,037
Career Dev. & Employment	1,219	577	7	–	–	157	1,960
Education	1,094	115	28	–	–	668	1,905
Labour	1,256	265	–	–	–	57	1,578
Advanced Education	1,174	–	–	–	–	100	1,274
Environment Council	1,221	–	–	–	–	–	1,221
Family & Social Services (2)	847	100	24	–	–	124	1,095
AADAC	899	–	–	–	–	–	899
Occupational Health & Safety	611	25	95	–	–	–	731
Attorney General	–	–	303	–	–	–	303
Recreation & Parks	17	–	116	–	29	–	162
ACCESS	145	–	–	–	–	–	145
Total	**102,947**	**70,889**	**40,824**	**2,146**	**35,028**	**16,329**	**268,163**

1: includes the Department of Environment and the Environmental Centre

2: obtained from the estimates of the 1989/90 survey

Measured in person-years, in-house scientific personnel are categorized as technical, science and professional, or "other." These individuals perform R&D, RSA or administers extramural programs(AEP).

The majority of 1990/91 scientific personnel belonged to one of five departments: Agriculture, Culture and Multiculturalism, Forestry, Lands and Wildlife, Transportation and Utilities, or Environment. These five departments accounted for 78% of all personnel. Accordingly, these organizations were the ones which had the highest intramural expenditures.

As indicated on Table 4, the bulk of provincial science personnel concentrated on RSA. These activities include technical and statistical surveys, information services, special services and studies, and education support. Of the 442 personnel engaged in R&D most were involved in the natural sciences and engineering. Provincial science employees engaged in the AEP accounted for only 6% of the total science labour force.

Table 4

Provincial Personnel Engaged in Scientific Activities by Major Department/Agency and Activity, 1990-91

Dept/Agency	R&D	RSA	AEP	Total
		(person-years)		
Agriculture	141	272	12	425
Culture and Multiculturalism	–	275	–	275
Environment	184	141	3	328
Forestry, Lands and Wildlife	43	245	40	328
Transportation and Utilities	14	137	1	152
Other	60	342	63	465
Total	**442**	**1,412**	**119**	**1,973**